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APPENDIX

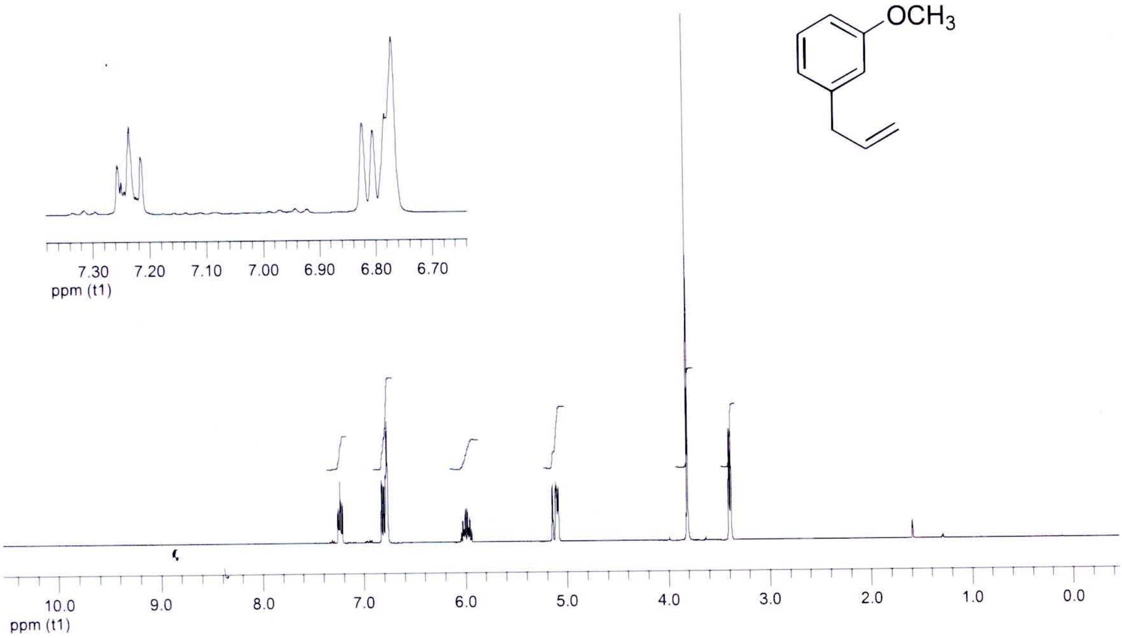

Figure 62 ^{1}H NMR spectrum of 3-allylanisole (1)

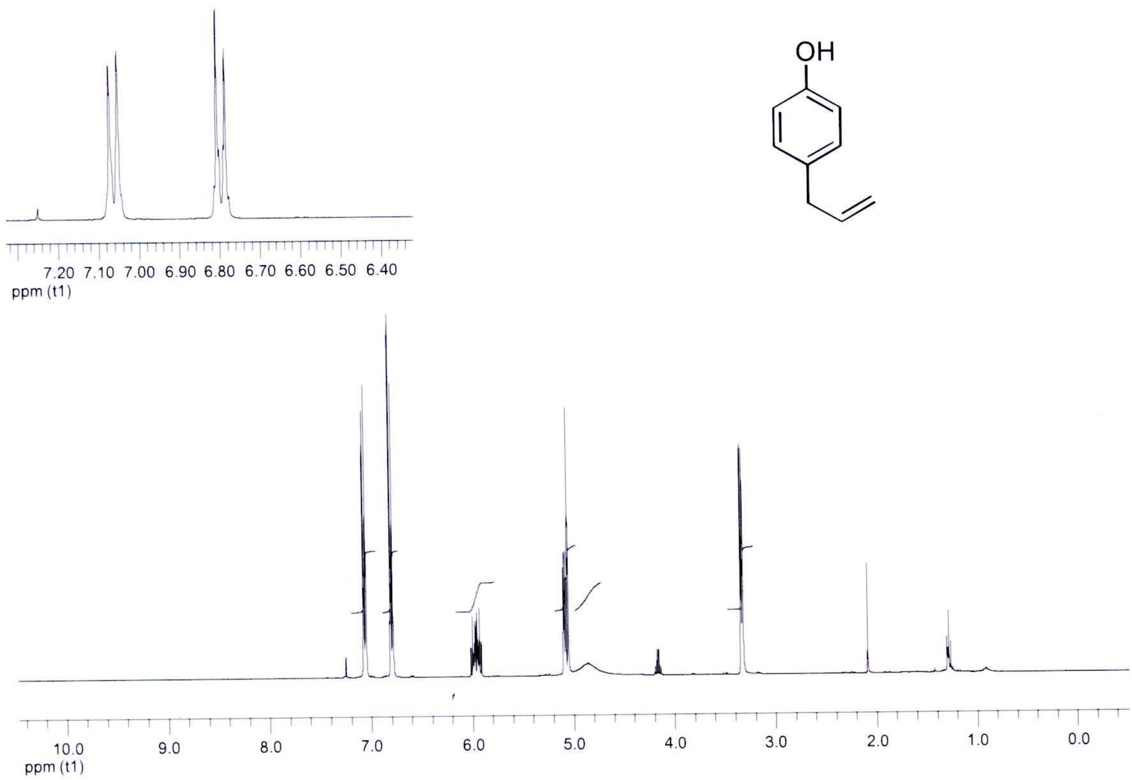

Figure 63 ^{1}H NMR spectrum of 4-allylphenol (2)

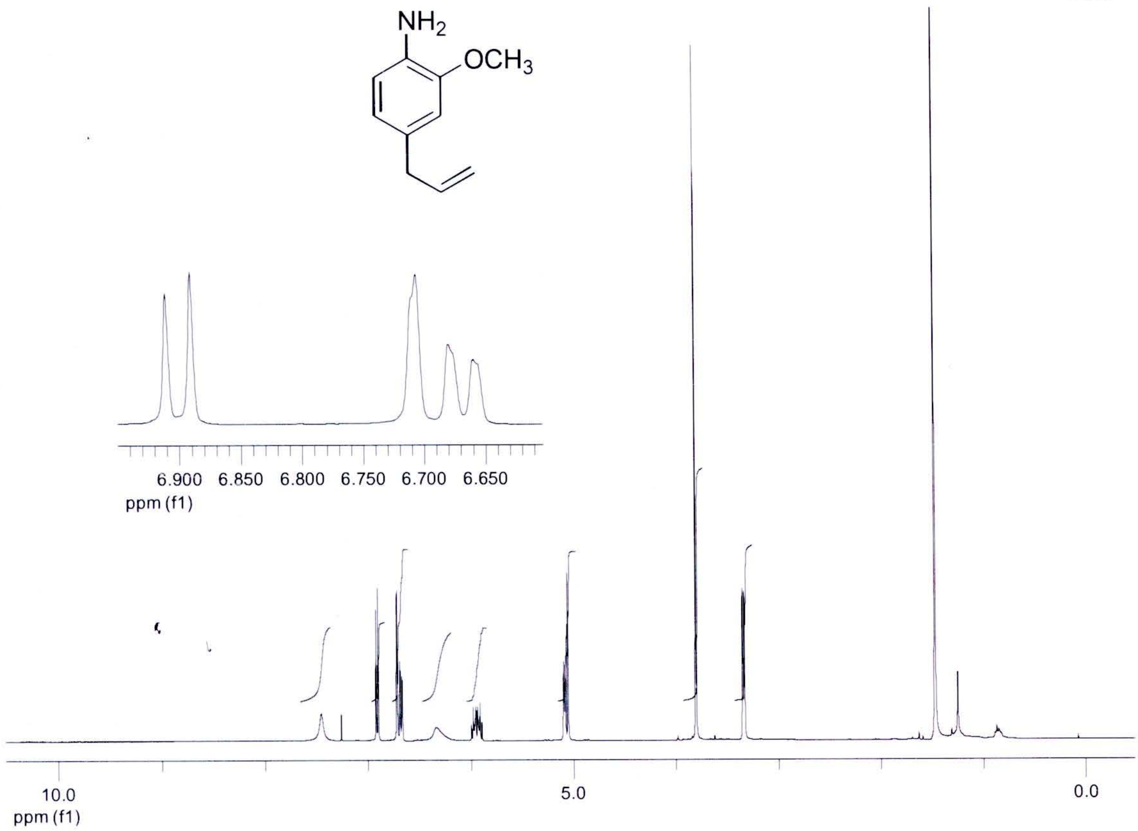

Figure 64 ^{1}H NMR spectrum of 4-allyl-2-methoxybenzenamine (4)

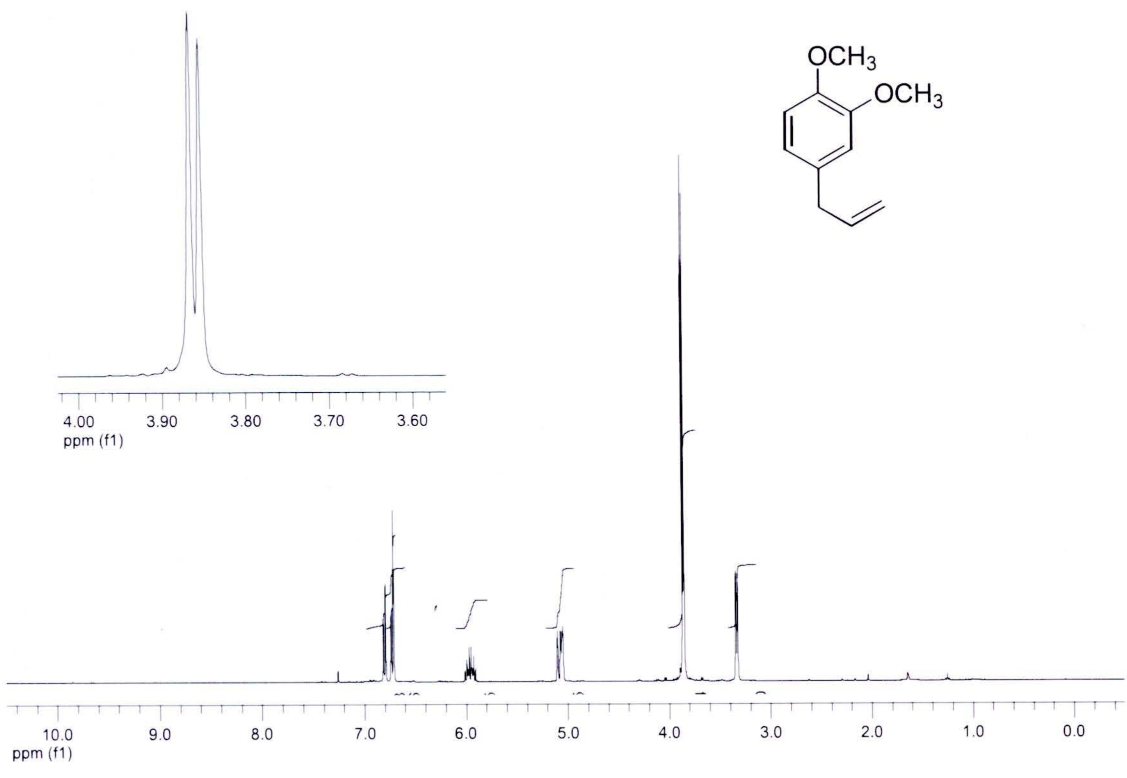

Figure 65 ^{1}H NMR spectrum of methyleugenol (5)

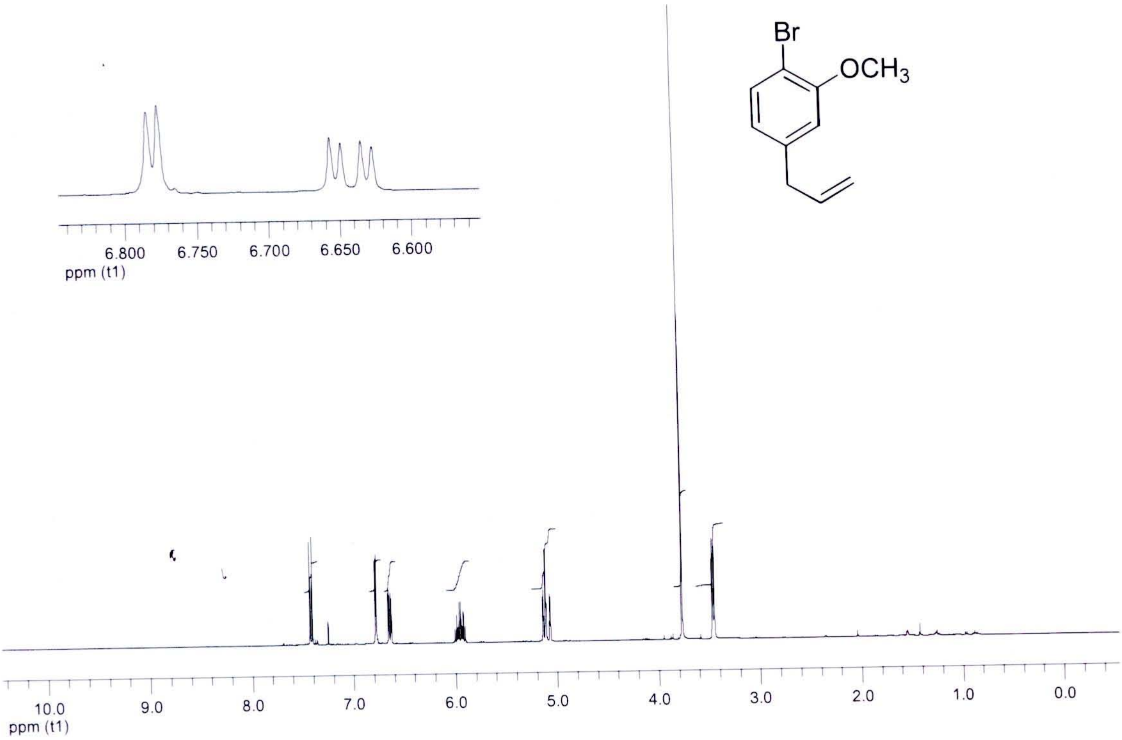

Figure 66 ^{1}H NMR spectrum of 4-allyl-1-bromo-2-methoxybenzene (6)

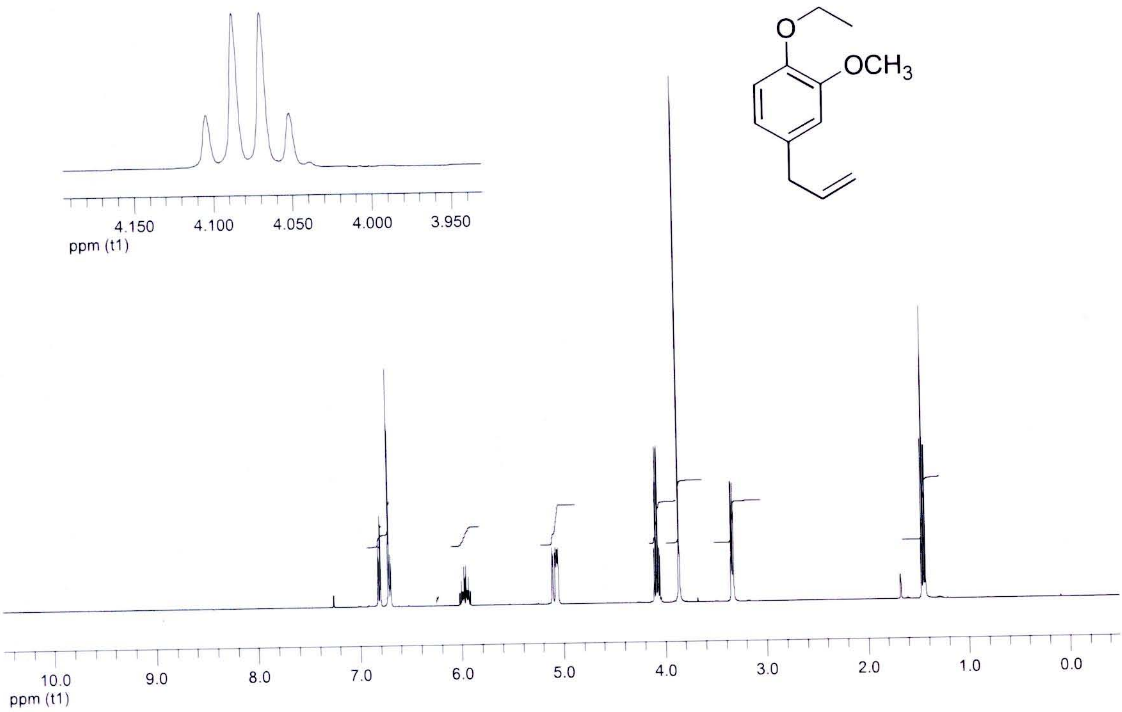

Figure 67 ^{1}H NMR spectrum of ethyleugenol (7)

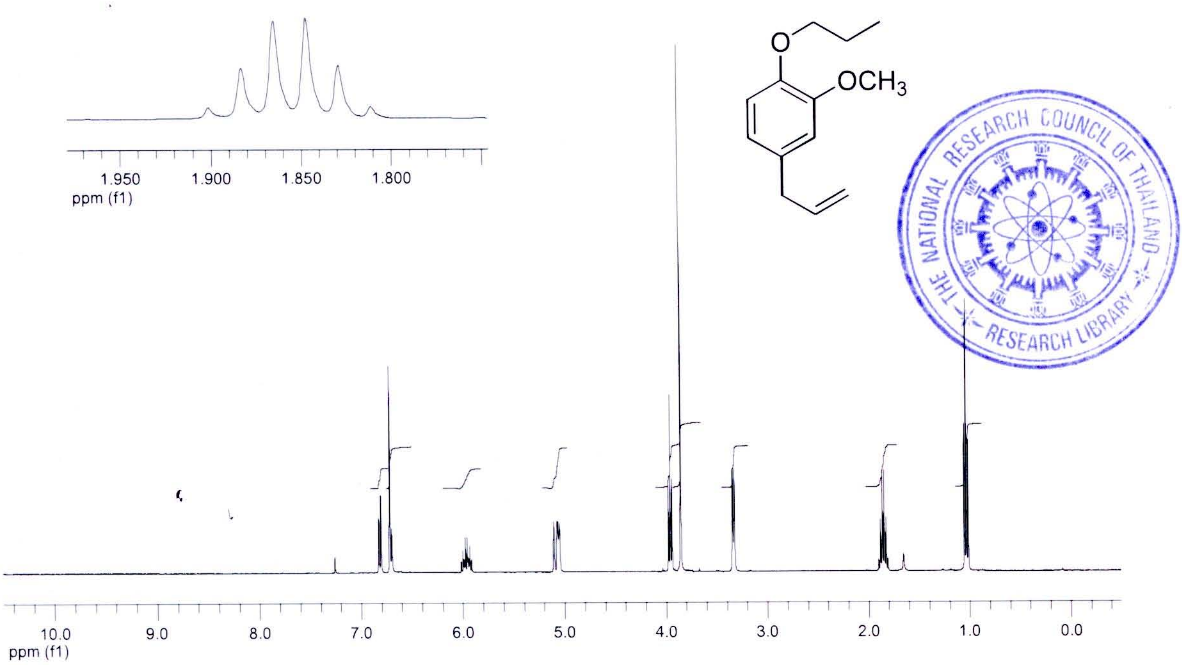

Figure 68 ^{1}H NMR spectrum of propyleugenol (8)

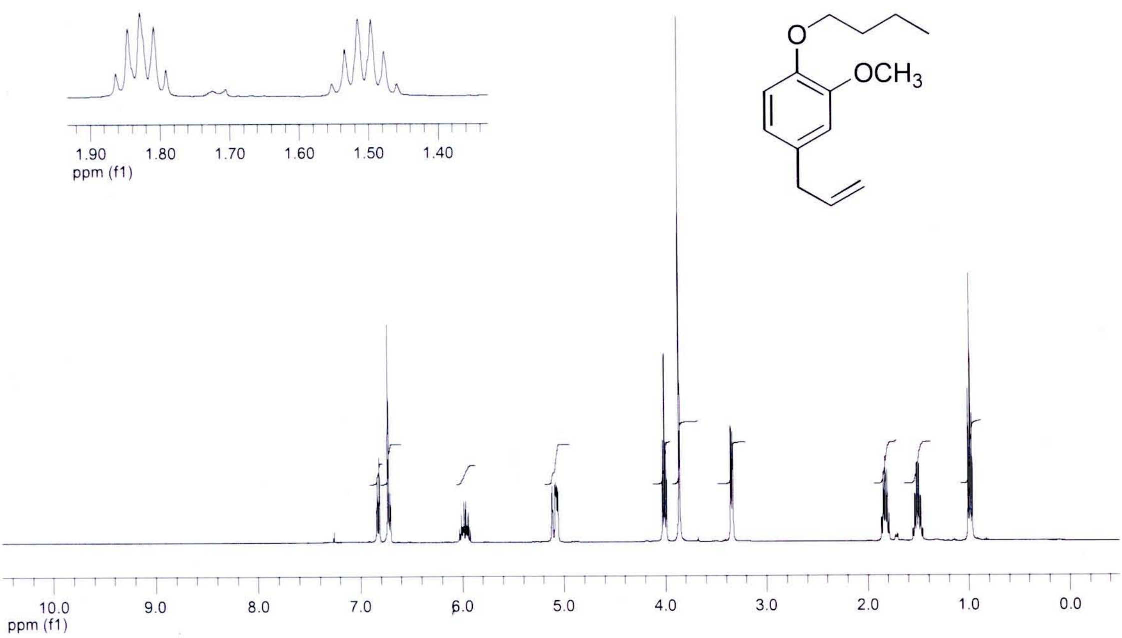

Figure 69 ^{1}H NMR spectrum of butyleugenol (9)

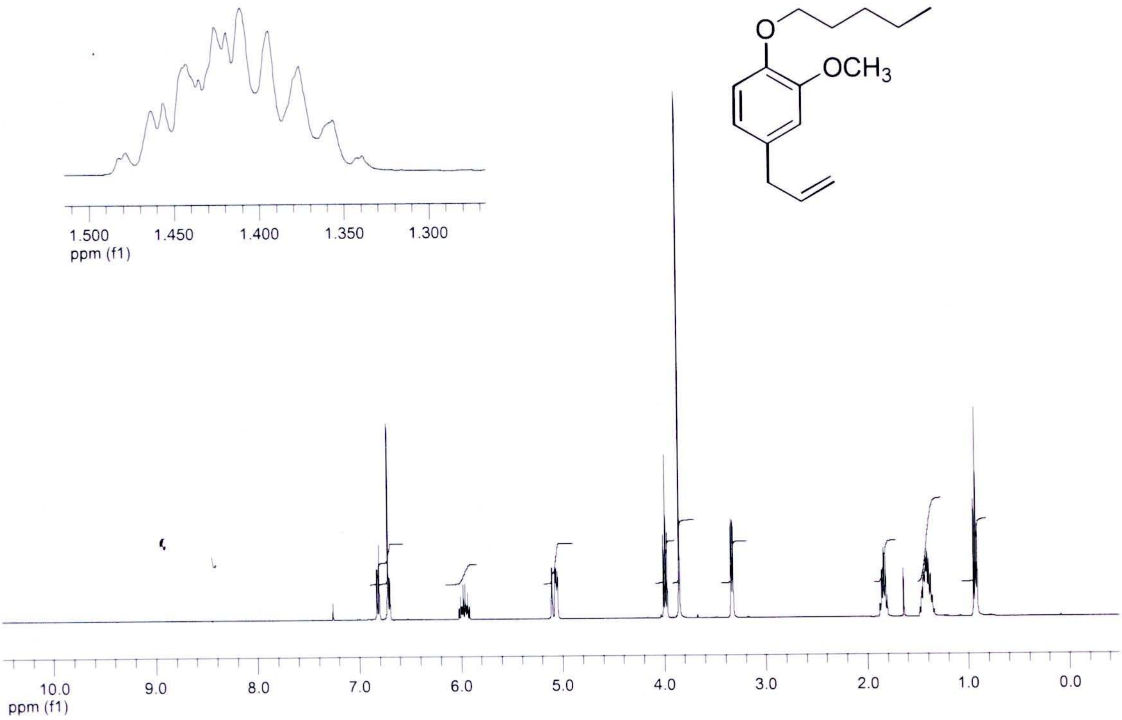

Figure 70 ^{1}H NMR spectrum of pentyleugenol (10)

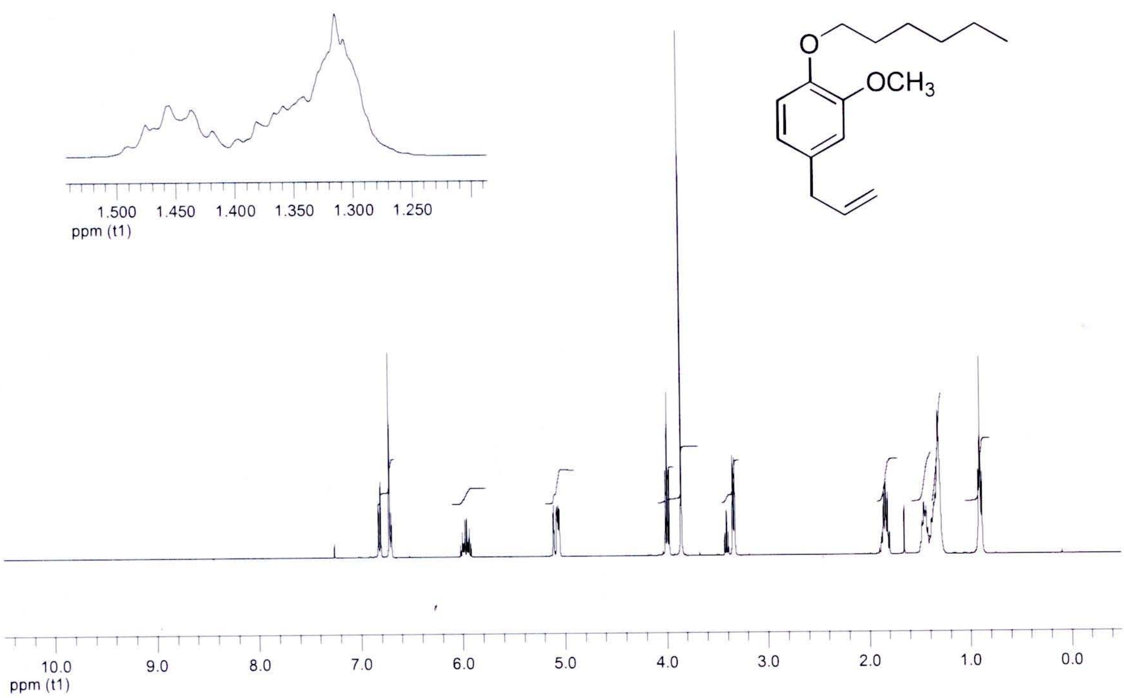

Figure 71 ^{1}H NMR spectrum of hexyleugenol (11)

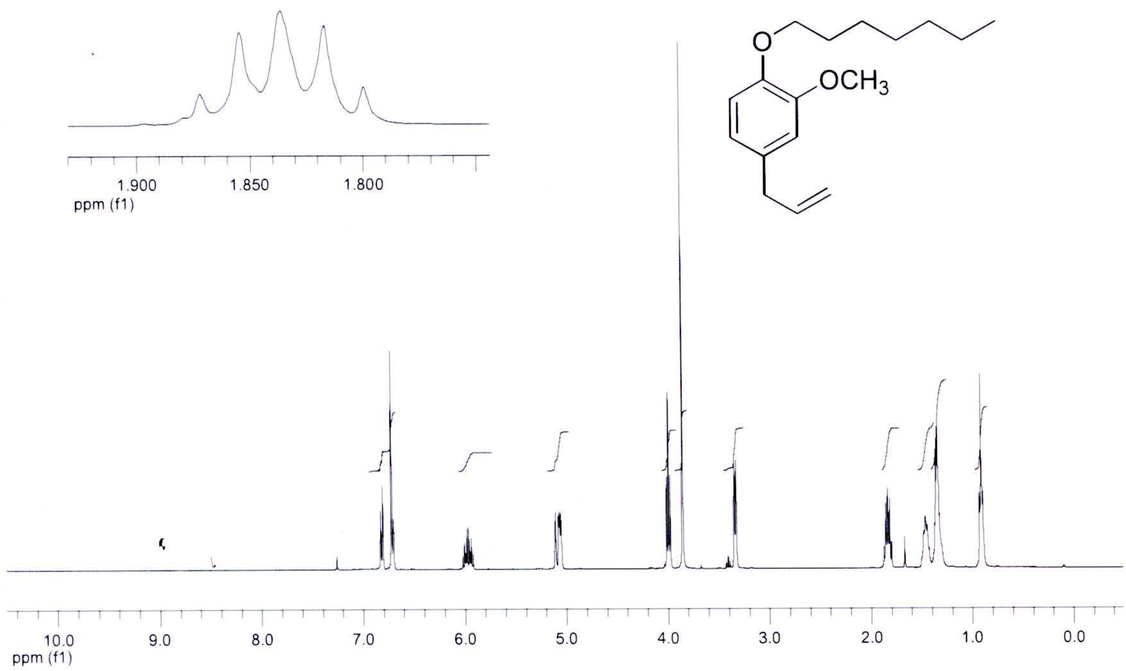

Figure 72 ^{1}H NMR spectrum of heptyleugenol (12)

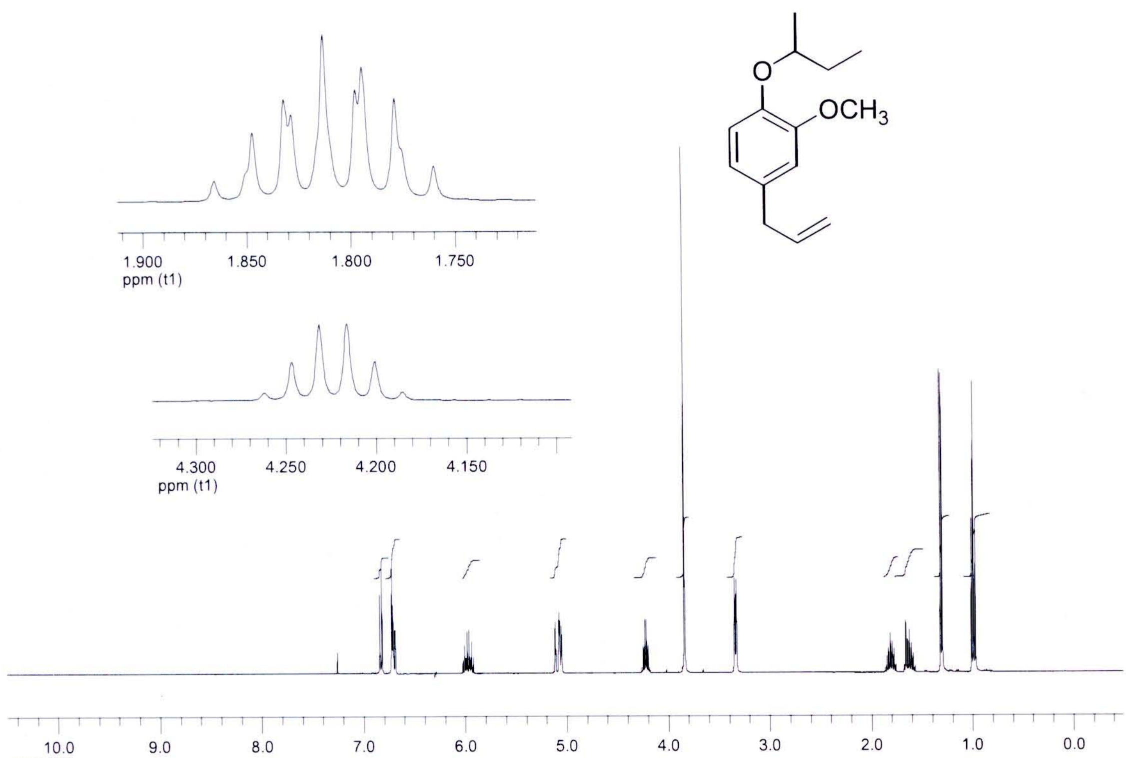

Figure 73 ^{1}H NMR spectrum of *sec*-butyleugenol (13)

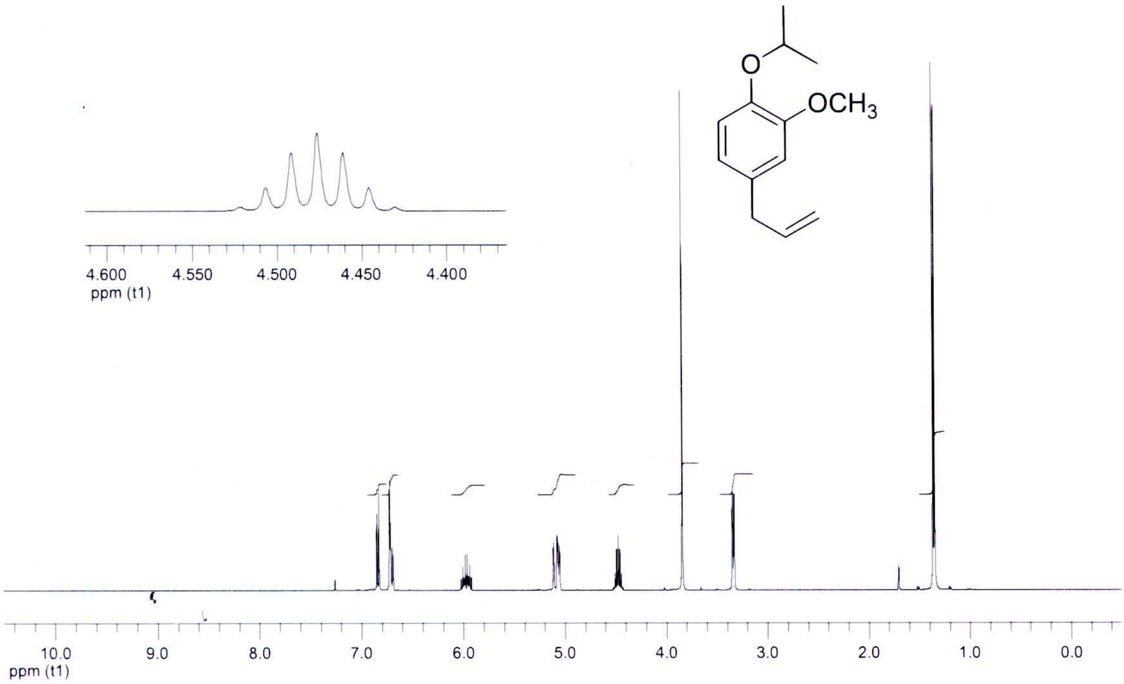

Figure 74 ^{1}H NMR spectrum of *iso*-propyleugenol (14)

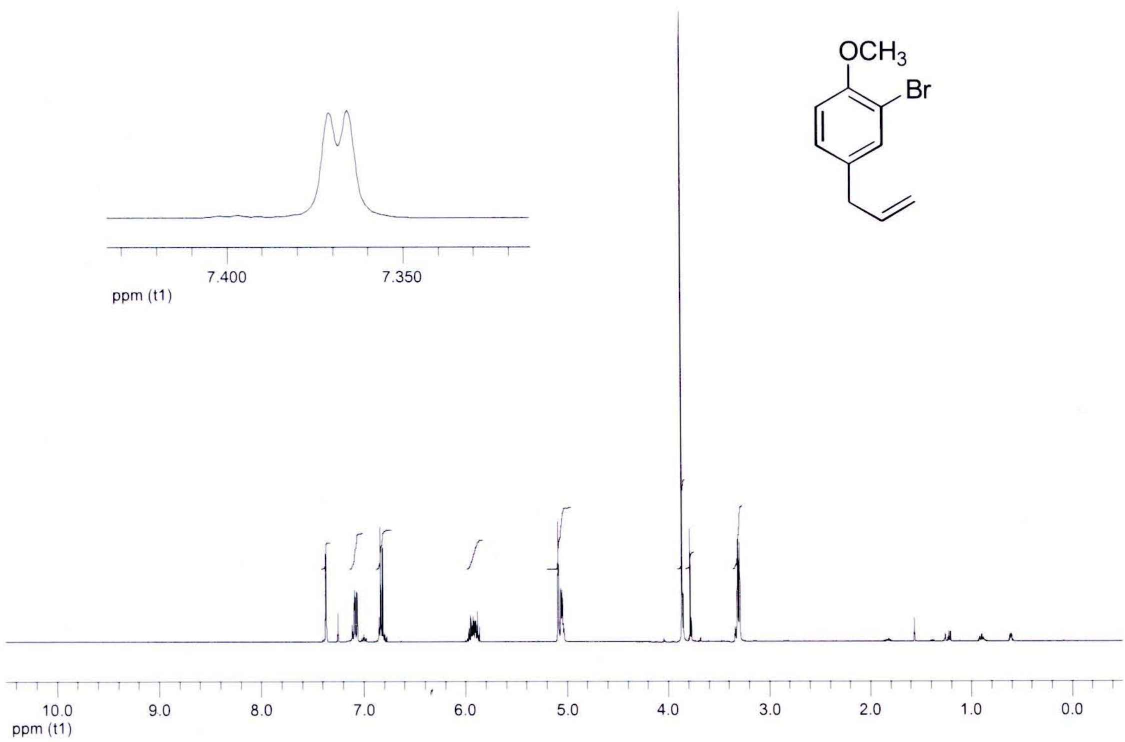

Figure 75 ^{1}H NMR spectrum of 4-allyl-2-bromo-1-methoxybenzene (15)

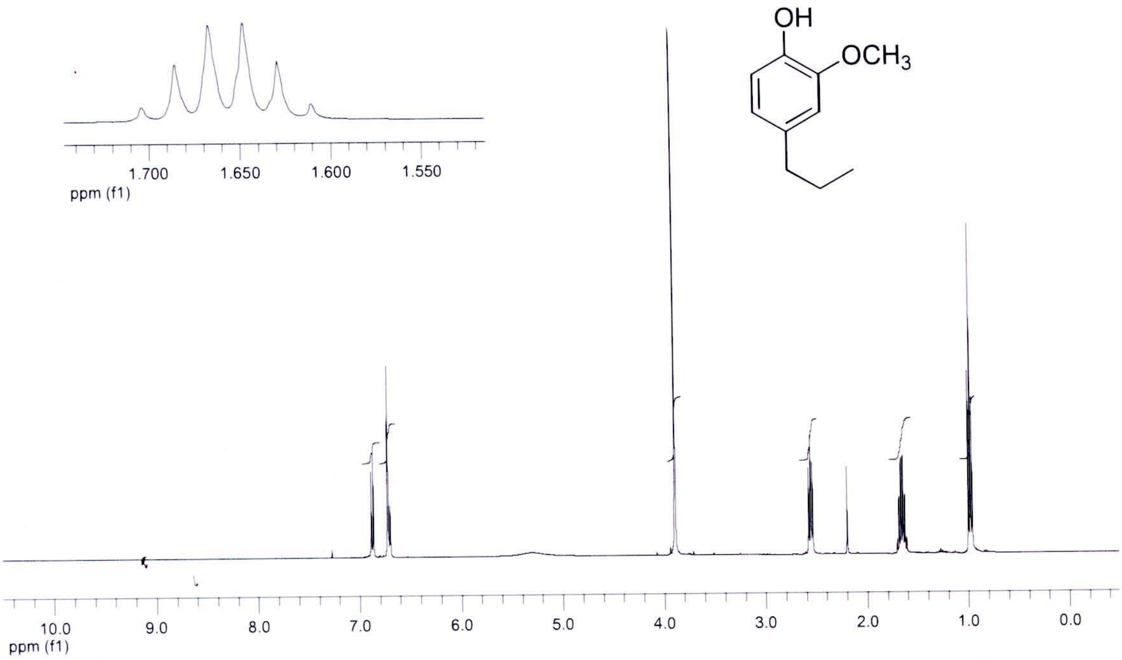

Figure 76 ^{1}H NMR spectrum of 2-methoxy-4-propylphenol (PMP) (17)

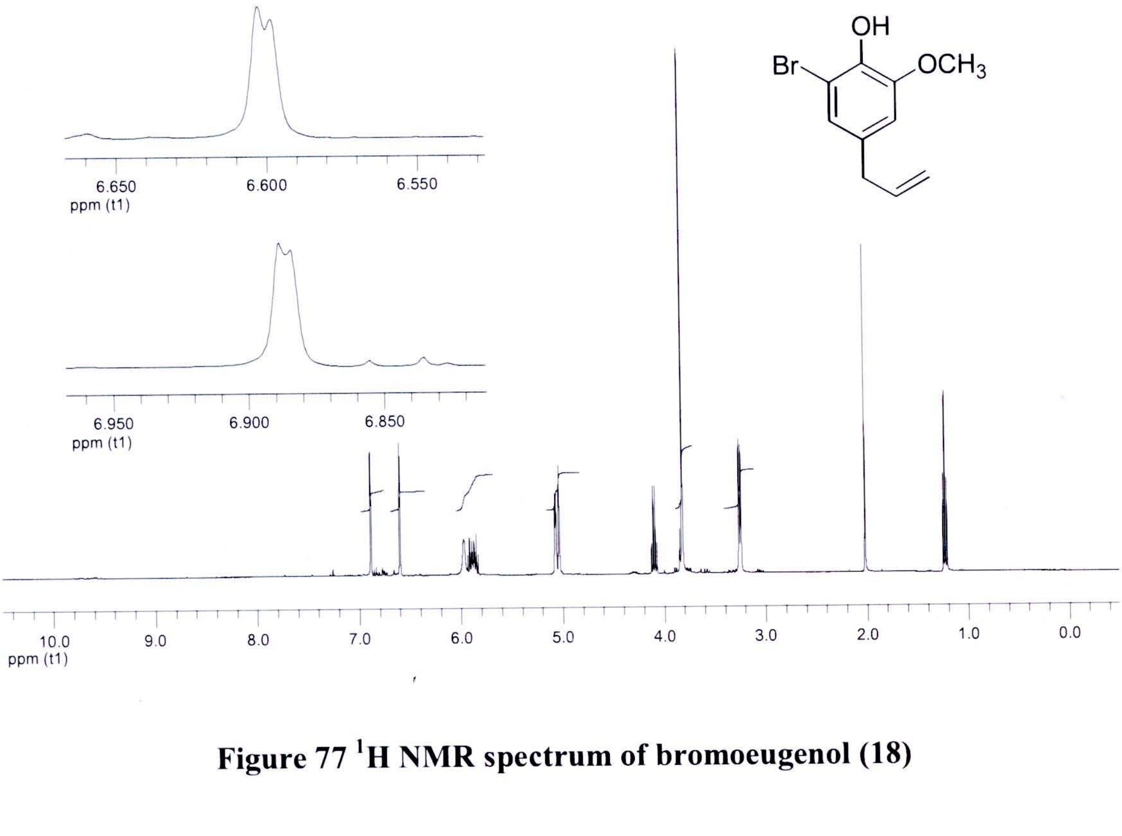

Figure 77 ^{1}H NMR spectrum of bromoeugenol (18)

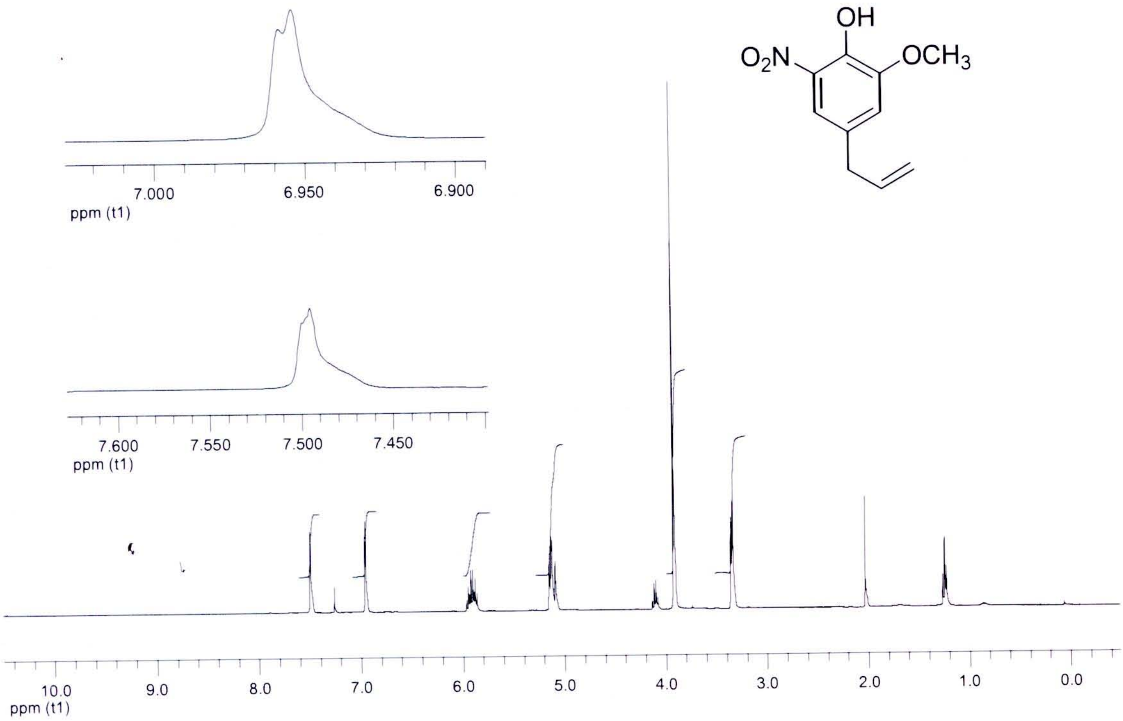

Figure 78 ^{1}H NMR spectrum of nitroeugenol (19)

Table 20 Introduced time, recovery time and survival rate in post larvae *L. vannamei*

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
1	25	-	-	100
	50	2:51	4:00	93.3
2	25	11:26	4:16	90.0
	50	5:03	3:56	96.6
3	25	-	-	100
	50	-	-	100
4	25	-	-	100
	50	-	-	100
5	25	-	-	100
	50	16:40	3:00	96.6
6	25	7:44	7:54	80.0
	50	6:40	28:25	80.3
7	25	-	-	100
	50	16:04	8:19	96.6
8	**25**	**7:59**	**4:23**	**100**
	50	**4:37**	**3:24**	**100**
9	25	17:29	12:07	90.0
	50	7:27	2:18	100
10	25	17:53	11:01	93.3
	50	13:06	8:23	90.0
11	25	-	-	100
	50	-	-	100
12	25	39:43	18:31	83.3
	50	28:24	8:39	96.6
13	25	26:04	19:55	96.6
	50	11:17	6:34	90.0

Table 20 (Cont.)

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
14	25	16:56	0:51	100
	50	7:15	4:18	100
15	25	6:18	7:34	100
	50	4:45	6:59	100
16	25	11:57	3:53	86.6
	50	3:44	6:13	96.6
17	25	7:20	6:45	100
	50	2:53	5:59	100
18	25	32:13	7:27	100
	50	27:19	6:47	93.3
19	25	-	-	100
	50	-	-	100
20	25	3:37	4:12	86.6
	50	3:19	5:30	100

Table 21 Introduced time, recovery time and survival rate adult *L. vannamei*

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
1	25	3:27	8:02	100
	50	1:30	4:37	93.3
2	25	-	-	90.0
	50	8:06	2:30	96.6
3	25	-	-	100
	50	-	-	100
4	25	-	-	100
	50	-	-	100
5	25	17:35	36:03	80.0
	50	11:36	35:25	100
6	25	3:08	5:06	83.3
	50	2:20	4:14	75.0
7	25	6:11	6:11	90.0
	50	5:30	35:25	80.0
8	**25**	**4:27**	**38:58**	**100**
	50	**4:36**	**40:24**	**90.0**
9	25	4:31	13:55	30.0
	50	4:21	11:31	100
10	25	5:23	10:31	20.0
	50	4:34	10:39	40.0
11	25	6:34	13:32	100
	50	5:34	14:26	10.0
12	25	7:26	11:44	80.0
	50	6:23	12:03	50.0
13	25	5:22	10:34	80.0
	50	4:12	12:28	80.0

Table 21 (Cont.)

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
14	25	5:19	37:03	100
	50	8:31	8:09	10.0
15	25	-	-	-
	50	-	-	-
16	25	-	-	100
	50	18:20	6:09	100
17	25	10:16	30:25	80.0
	50	11:11	25:39	80.0
18	25	-	-	100
	50	-	-	93.3
19	25	-	-	100
	50	-	-	100
20	25	17:02	4:14	100
	50	6:04	4:17	100

Table 22 Introduced time, recovery time and survival rate in post larvae *L. calcarifer*

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
1	25	2:41	0:24	100
	50	1:20	0:10	100
2	25	3:38	0:38	60.0
	50	2:42	0	0
3	25	-	-	100
	50	-	-	100
4	25	-	-	100
	50	6:23	2:43	93.3
5	25	1:16	5:23	93.3
	50	0:44	6:40	96.6
6	25	8:01	8:05	13.3
	50	5:20	3:15	13.3
7	25	6:05	7:59	96.6
	50	2:56	9:11	93.3
8	**25**	**3:12**	**14:07**	**96.6**
	50	**3:00**	**6:29**	**50.0**
9	25	18:51	3:50	73.3
	50	10:29	1:32	46.6
10	25	13:28	0	0
	50	8:39	0	0
11	25	-	-	100
	50	-	-	100
12	25	-	-	100
	50	-	-	100
13	25	8:05	0	0
	50	6:28	0	0

Table 22 (Cont.)

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
14	25	12:48	15:33	100
	50	6:39	17:24	80.0
15	25	10:49	51:09	20.0
	50	5:20	34:43	26.6
16	25	0:55	2:47	100
	50	0:35	3:45	100
17	25	8:48	6:20	96.6
	50	4:38	6:29	100
18	25	10:41	2:16	100
	50	3:32	2:31	100
19	25	-	-	100
	50	-	-	100
20	25	1:07	4:07	100
	50	0:36	3:34	100

Table 23 Introduced time, recovery time and survival rate in post larvae *C. macrocephalus*

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
5	25	3:13	29:17	100
	50	3:05	34:40	94
7	25	8:15	10:17	96
	50	7:08	10:50	86
8	**25**	**3:06**	**37:17**	**100**
	50	**2:10**	**43:50**	**100**
9	25	3:13	9:17	92
	50	3:01	10:00	94
10	25	9:00	7:33	95
	50	8:11	10:16	70
11	25	8:11	10:33	100
	50	7:10	10:50	90
12	25	8:01	12:50	90
	50	7:10	13:20	90
13	25	4:11	9:50	100
	50	4:08	11:00	86
14	25	10:11	4:67	100
	50	8:10	9:50	90
17	25	12:10	9:00	86
	50	9:13	12:34	70
20	25	9:08	14:23	86
	50	7:17	17:16	75

Table 24 Introduced time, recovery time and survival rate adult *C.macrocephalus*

Compound (derivative)	Concentration (ppm)	Introduce time (min)	Recovery time (min)	Survival rate (%)
5	25	4:50	25:10	100
	50	4:30	32:20	100
7	25	10:10	10:20	90
	50	7:20	10:50	86
8	**25**	**4:27**	**31:00**	**100**
	50	**3:20**	**40:50**	**100**
9	25	4:50	7:10	92
	50	4:30	5:40	88
10	25	8:30	7:40	80
	50	7:50	9:10	92
11	25	8:33	8:10	100
	50	7:17	7:00	80
12	25	9:50	12:20	90
	50	7:34	12:10	86
13	25	5:20	6:40	100
	50	4:20	7:50	90
14	25	12:20	5:60	90
	50	9:20	7:50	90
17	25	13:40	9:30	80
	50	11:17	12:20	70
20	25	10:20	10:30	81
	50	8:34	12:40	70

BIOGRAPHY

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